

**OSCILLATIONS IN GAS-TURBINE COMBUSTORS;
CONTROL OF RUMBLE, PATTERN FACTOR AND EMISSIONS**

First Interim Report

by

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The results of experiments performed with combustion of kerosene in a combustor sector rig, based on a helicopter engine, have been assembled and examined. The measurements were conducted at two air-fuel and two air-preheat temperatures corresponding to cruise and take off and at atmospheric pressure and include temperatures and concentrations of major and minor species at the exit plane of the combustor without and with a turn-around duct. They show important reductions in NO_x concentrations in two cases but, after modifications to the combustor, small reductions were observed. Improvements in pattern factor were also observed provided that the amplitude of the oscillations was sufficient.

The above results are still being examined and, in the meantime and in order to achieve a more controlled environment, the combustor has been modified to allow the use of gas rather than liquid fuel. Provision has been made for two arrangements of fuelling, one with nozzles which simulate liquid sprays and the other with the T-vaporiser used for the liquid-fuel experiments and this time with gaseous fuel. These arrangements will also facilitate the examination of the control of rumble within the combustor by the use of gas jets with imposed oscillations and with the possibility of out-of-phase oscillations from neighbouring injectors.

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